AMSS detected, the Multicarrier Modulation (MCM) demodulator can drift out of lock. In another instance, the channel can have delayed signal(s) that are stronger than the earlier arriving signal. The current AMSS algorithm tends to lock onto the strongest signal rather than the desired earliest signal, causing severe intersymbol interference. Thus, the method and apparatus claimed can provide reliable symbol timing in conditions where current OFDM symbol synchronization is susceptible to corruption or intersymbol interference.

Further, referring to paragraph 0040 and FIG. 6, the specification and flow chart clearly discusses narrowing a search window for a synchronization symbol and adjusting the timing to an earlier arriving signal detected by a synchronization symbol recovery detector after detecting a negative phase in an OFDM modulated signal at decision block 602. Narrowing a search window for a synchronization window and adjusting timing should be well known to one ordinarily skilled in the art as exemplified by the narrowing window used in the IS-95 specification for CDMA cellular communications and the adjusted timing used for indoor communications for multi-user detection (MUD) algorithms as described in a paper by Paul James Husted.

Likewise, with respect to Claim 7, disabling a synchronization symbol recovery algorithm is clearly taught in FIG. 7 and in paragraph 0040. Disabling a synchronization symbol recovery algorithm should be self explanatory. If a negative timing offset from the AGD calculator (310) is detected, then a synchronization symbol recovery algorithm is disabled. The timing can be adjusted until a non-negative phase is detected. In other words, at step 706, once the timing is adjusted that a non-negative phase is detected, no further timing adjustments are required.

The Examiner next rejected claims1 and 3-4 as being anticipated by Sugita et al. (U.S. Patent No. 5,608,764). Although Sugita does discuss a method of synchronization in an OFDM system, Sugita fails to teach, suggest, mention, or contemplate using a phasor to estimate an average delay of a multi-carrier modulation symbol for determining a timing offset over a set of OFDM symbols as recited in claim 1. In a more specific claim as recited in claim 3, Sugita surely fails to teach or remotely contemplate using the phasor to estimate the average delay of the multi-carrier modulation symbol by computing a differential phasor between each pair of adjacent OFDM subcarriers, removing QPSK data by rotating the differential phasor to a first quadrant, and computing an average phasor angle as recited in claim 3.

The Examiner rejected claim 5 under 35 USC section 103(a) as being unpatentable over Sugita. The Examiner even conceded that Sugita does not specifically teach the step of maintaining symbol synchronization without ever detecting the synchronization symbol. The fact that Sugita discusses phase comparators does not begin to teach or suggest the maintenance of symbol synchronization without ever detecting the synchronization symbol as recited in claim 5. The Examiner's statement that it would have been obvious to one or ordinary skill to find that the detecting of the synchronization symbol is optional for maintaining symbol synchronization is conclusory and not supported by the Sugita reference.

The examiner further rejected claim 8-9 and 11-13 under 35 USC section 103(a) as being unpatentable over Sugita in view of Uchiyama et al, U.S. Patent No. 6,744,828 (Uchiyama). Once again, as with claim 1, Sugita fails to teach, suggest, mention, or contemplate using a phasor to estimate an average delay of a multi-carrier modulation symbol for determining a timing offset over a set of OFDM symbols. Likewise Uchiyama fails to teach, suggest, mention, or contemplate using a phasor to estimate an average delay of a multi-carrier modulation symbol for determining a timing offset over a set of OFDM symbols. Further, neither Sugita or Uchiyama individual or in any combination teach or suggest using the phasor to estimate the average delay of the multi-carrier modulation symbol by computing a differential phasor between each pair of adjacent OFDM subcarriers, removing QPSK data by rotating the differential phasor to a first quadrant, and computing an average phasor angle as recited in claim 11. The phase comparators of Sugita do not equate or even begin to suggest the phasors as recited in claims 8-13.

Claims 14 (dependent upon claim 1) and 15 (dependent upon claim 8) have been added to further define that the angle of the phasor is an estimate of the Average Group Delay and is directly proportional to the timing offset as fully supported in paragraph 0039 of the specification.

Consequently, an indication of allowability is respectfully requested. Should any minor points remain prior to the issuance of a Notice of Allowance, the Examiner is requested to telephone the undersigned at the below listed telephone number.

Respectfully submitted,

Date: Jan 3, 2006

Pablo Meles, Registration No. 33,739
AKERMAN SENTERFITT
Post Office Box 3188
West Palm Beach, FL 33402-3188
Telephone: (954) 463-2700